AMERICAN JOURNAL OF PHARMACY

and

THE SCIENCES SUPPORTING PUBLIC HEALTH

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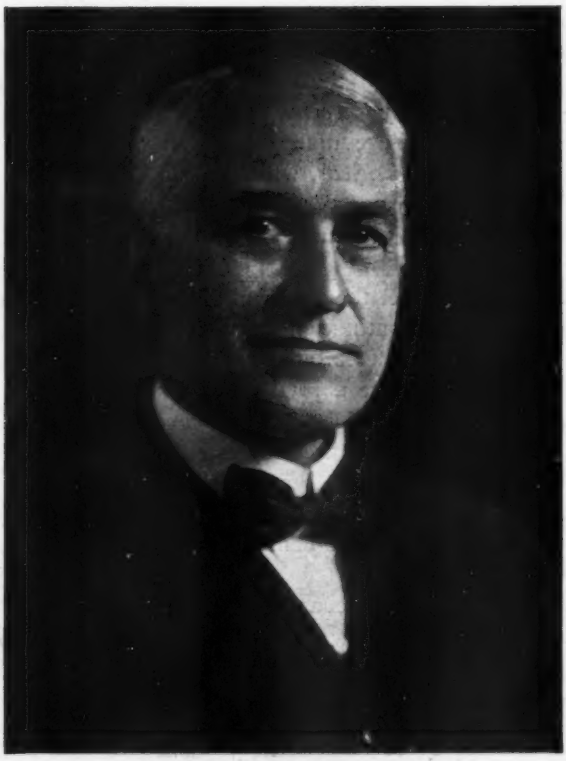

DR. EUGENE G. EBERLE

1863-1942

The above is a reproduction of a photograph taken at the zenith of his career. His passing leaves a sense of sadness to all those who knew and loved him.

MAY
1942

IN Anorexia

. . . *"Receiving thankfully all that physiology or chemistry or any other science can give us, let us still hold that that alone is true which is proved clinically, and that which is clinically proved needs no further evidence."*

—SIR JAMES PAGET

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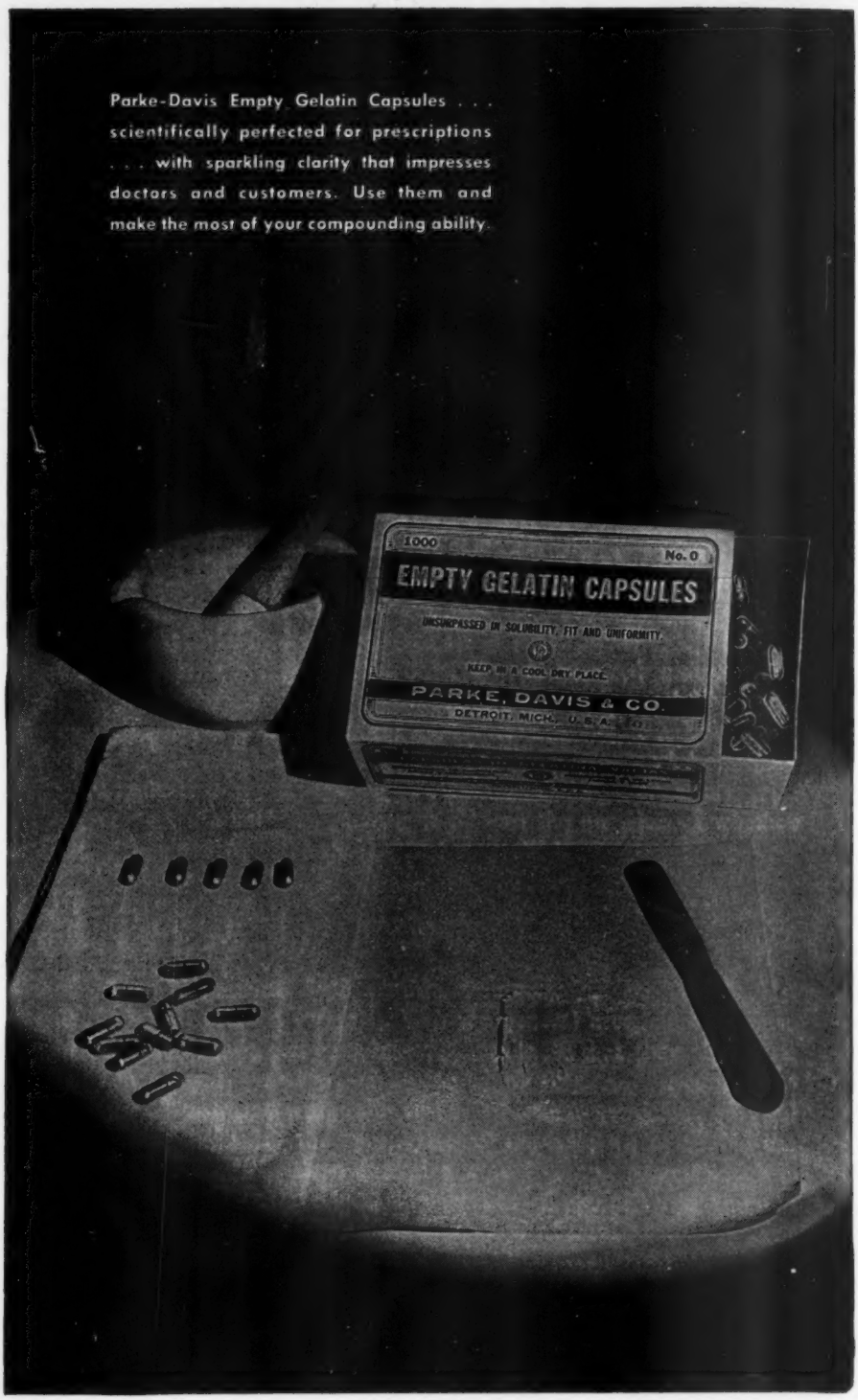

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OUR COVER

DR. EUGENE G. EBERLE

American Pharmacy owes much to the tireless and life-long efforts of Eugene G. Eberle. The affection and esteem with which he was held by the thousands who knew him and worked with him is in itself a tribute to a life spent in the service of pharmacy.

Dr. Eberle was born at Watertown, Wisconsin, June 3, 1863. His early education was obtained in the Public Schools of that city and Northwestern University. Coming to Philadelphia, he studied at the Philadelphia College of Pharmacy (and Science) and graduated in Pharmacy in 1884. He then entered the employ of Dunning and Summer in Madison, Wisconsin, leaving there to travel to Fort Worth, Texas. In 1894 he helped organize the Texas Drug Company.

Dr. Eberle helped organize the School of Medicine and Pharmacy at Dallas in 1900 and served as Professor of Pharmacy from then until 1915. In 1903 he was made Dean of the College of Pharmacy which at that time became a part of Baylor University. Both Baylor University and the Philadelphia College of Pharmacy and Science awarded him honorary degrees, the former the degree of M. A. in 1910 and the latter the Ph. M. in 1915.

Pharmaceutical journalism was one of Dr. Eberle's favorite fields and he founded the *Southern Pharmaceutical Journal* in 1908 and served as its Editor until 1915 when he became Editor of the *Journal of the American Pharmaceutical Association.*

The name of E. G. Eberle will be found widely spread in the annals of organized pharmacy during the period of his active career. He was President of the Texas Pharmaceutical Association and later served as its Secretary. He was elected Second Vice-President of the American Pharmaceutical Association in 1902, First Vice-President in 1908 and President in 1910.

The honors that have come to Dr. Eberle by reason of his many contributions have been legion and those of us who knew and loved him will miss his venerable presence and the warm and friendly clasp of his hand.

EDITORIAL

UNIFIED EFFORT—THE HOPE OF PHARMACY

IN these days of organized effort it becomes increasingly evident to any observer which of our many organizations function with power and efficiency and which fail to achieve a reasonable degree of accomplishment.

To one who is interested in pharmacy and the status of pharmacists there is bound to come some disappointment and chagrin that a profession so worthy and inherently valuable to the nation is so poorly considered by the various agencies which at present direct our war effort. Careful appraisal of this situation has brought forth certain definite conclusions which, although they may not be subscribed to by all, are herein presented none-the-less.

In the first place pharmacy is of utmost importance. To be deprived of its service would disrupt the entire program of civilian, as well as military, health. This may seem far-fetched to some but a careful analysis by anyone in possession of the facts will substantiate this claim. Why is it then that we are not better appreciated, given more recognition, and permitted to assume our rightful place in the public health program? The fault lies not with our service but in our own failure to present our case, clearly and forcefully for public consideration and approval.

Our organization in pharmacy is disunited and weak and instead of having a strong unified command we have a house divided against itself. The American Pharmaceutical Association which should have and deserves the support of *every* pharmacist in the country doesn't even represent a majority. With the means and backing at their command they make a valiant effort but how can any *real success* be expected without *real support.*

This writer gets a little provoked at pharmacists who assail this and that as being unfair to pharmacy who when asked if they belong to the A. Ph. A. invariably answer, "*No.*" How can any reasonable-minded person expect a return without any investment?

Too many pharmacists subscribe only to those organizations which protect their commercial interests with utter disregard of the fact that without professional recognition their reason for existence would *cease*. If pharmacists could be aroused to support the cause of pharmacy as they do fair-trade, all would be well, but while the fair-trade clamor goes on our professional interests go begging.

The strength of the medical profession lies not only in the public recognition that it enjoys, but, to a great degree, in that remarkable organization, the American Medical Association. Although it is true that this group enjoys unusual leadership, its strength and influence would be greatly diminished were it not for the physicians of America who loyally support it.

Let those of us who want to see American Pharmacy as strong and progressive as American Medicine take the first step in this direction by urging all who come in our sphere of influence to join the American Pharmaceutical Association and support its officers in their difficult tasks. Pharmacists, too long, have been following false prophets whose interests are not in pharmacy but in its exploitation. Let's give men a chance who love and honor pharmacy, men who represent the best American Pharmacy can offer. Then and only then can Pharmacy even hope to achieve the recognition it so properly deserves.

L. F. Tice.

KEEPING FIT FOR VICTORY †

By Hubley R. Owen, M. D.

WHEN your President, Dr. Ivor Griffith, asked me to address you this evening, and in thinking over that which I would say to you, immediately there recalled to my mind an anecdote told by one of your former Presidents, Doctor Wilmer Krusen, in addressing the graduating class of nurses at the Philadelphia General Hospital. Doctor Krusen related in his introductory remarks a quotation on the building of the Lower Merion High School—"Enter to Learn —Go Forth to Serve". Those words have always impressed me as a fitting quotation over any building dedicated to teaching.

I also recall the thoughts of the great John Abernethy when he walked into his lecture room at St. Bartholomew's Hospital and saw his class for the last time. He said to them, half in curiosity and half in sorrow—"Good God! What is to become of you all?" I feel less concerned about your future than about the graduating classes of other years.

All of you will be able to find employment immediately upon graduation, if you so desire. There is a scarcity of pharmacists, bacteriologists, laboratory technicians, chemists and biologists; in fact, there is a demand for workers in every phase of medicine today. Those who wish to find work will find it; those who do not wish to work will be similar to the proverbial wheel-barrow and will have to be pushed to get anywhere.

Some do not reach success because they complain they have had no help; some fail to reach their goal because there is no elevator to carry them there swiftly, and they are too lazy to travel step by step. Some prefer sitting at the bottom of the ladder and complaining it is too hard to climb. Some younger people are pushed from the ladder of success by older ones on the way down. Some who rise to the top will fail because they are unable to stand the altitude.

I was told many years ago that when a doctor becomes lazy he takes a political job! If you never try by hard work to better your condition, you will be like the old canal horse who was so accustomed

† Address delivered at the One Hundred and Twentieth Annual Commencement of the Philadelphia College of Pharmacy and Science, May 27, 1942.

to going on the same level that he couldn't climb the hill when he came to it.

You will now be told that you are on your own and must paddle your own canoe, but I am not unmindful, as in my own experience, that a short tow to that canoe at the opportune moment is often a life saver.

In your future work in the field which you have elected to follow, you will find many different phases of men and kinds of character. Do not judge them too hastily. Some with whom you may differ are entitled to their point of view. Because you disagree does not necessarily mean that they are wrong.

> "In men whom men condemn as ill,
> I find so much of goodness still.
> In men whom men pronounce divine,
> I find so much of sin and blot
> I do not dare to draw a line
> Between the two where God does not!"

Never let jealousy predominate your character; it is one of the meanest and most foolish of vices. An individual may be able to do some one thing better than you, but you can do another phase of work better than he. If you acknowledge that he can do everything better than you, you either have an inferiority complex, or lack confidence in yourself.

I still recall the last lecture given to us in the Class of 1905, Medicine, University of Pennsylvania, by the late Doctor John G. Clark, eminent Professor of Gynecology. Doctor Clark told us that Hippocrates was once asked to what he attributed his great success. His answer was: First, work; Second, more work; Third, harder work. Doctor Clark stated he did not agree with those sentiments as expressed. He thought that for a professional man, or nurse, the three greatest attributes were: First, work; Second, observation; and Third, tact—and to that I might add, personality. I mentioned this to the late Doctor J. Chalmers daCosta one night. He told me that he liked the first two qualifications; namely, work and observation, but that in his opinion tact was only a lie with a college education.

Be that as it may, we all realize that in every walk of life one must have tact. In the medical profession one must occasionally tell a "white lie", even though it may have a college education. The

only excuse for such a college educated lie is to save a patient from a truth which might close the door to all hope. We must never open a door to a patient's mind which reads—"Ye who enter here, leave all hope behind".

As Doctor W. W. Keen, that eminent Surgeon, once properly said—"It is not a question of how long we live, but how we live". In other words, if a patient is suffering from an incurable and painful disease, or from mental anxiety from a cause which is incurable, life is hardly worth while. Even to such, however, we must never close the door of hope.

There have been instances of men, although racked by disease or infirmity, who have been successful in their respective vocations. This is unusual. Usually the successful man is physically fit. There is, of course, a great difference of opinion as to what qualifications comprise physical fitness. A man may be physically fit to qualify for one position, but would not qualify for another. Probably the highest physical qualifications which now exist are those which are demanded for the Flying Corps in the Army or Navy. These are, naturally, far more stringent than those for many other branches of the Service. Exigencies of the case demand a more varied interpretation of a physical standard.

We have heard the results of the first examination held for the men chosen for selective service. Of the first two million men examined for the Army, approximately one million could not qualify for Army requirements. One hundred thousand were rejected for varying degrees of illiteracy, and nine hundred thousand for physical and mental deficiencies, defects, disorders and disease.

These figures do not represent fifty per cent of invalidism, or fifty per cent of the illness of the population in general, but merely represented that fifty per cent were unable to meet the physical requirements at that time. Some of those who were not accepted were put on the deferred list, and subject to call again.

If we raise an Army of eight million men, it is extremely doubtful whether the standard of physical requirements will hold for the eight millionth man as it did for the first.

There is another point of interest. The physical qualifications of the U. S. Army are high. The physical aspect of our Armies in the past has always excelled those of other nations. Not only is the physique of our Army the highest, but also the mental qualification, which is of paramount importance. This mental attitude of the will

to win is characteristic of the American soldier. The American soldier does not fight as an automaton. The American soldier uses his initiative and is not "goose-stepped" into action as is the German.

If one million Japanese men were examined for the U. S. Army, what proportion do you believe would pass our physical requirements? Very few! This is one of the reasons which readily explains reports coming from Bataan, Corregidor and other places in the Far East, that one American can lick eight Japs. This has been true of our Air Forces, as well as our Land Forces.

We are going to have the healthiest Army which has ever entered a field of battle. It is interesting to note that the history of the Army Medical Department commenced with the siege of Boston in 1775. The Second Provincial Congress of Massachusetts Bay, in passing an act creating medical service for the Continental Forces, provided for two surgeons and two surgeons' mates to a hospital.

In the first manual of Army Regulations, issued in 1779, the rules governing such medical service were short and simple. They consisted of little more than an injunction to see that the sick and wounded men had plenty of fresh straw on which to lie.

No method for the evacuation of battlefield casualties was developed until the Civil War, when Doctor Jonathan Letterman, a surgeon, devised a system that has just become the basic pattern of the field medical services of all the great powers.

Preventive medicine has played a very important role in the health of our Army. Typhoid fever, the great killer of the Spanish-American War, has been virtually eliminated. In that war 4,800 out of every 100,000 contracted the disease, and 525 of that number died with it.

In 1918, this percentage had been reduced, thanks to typhoid vaccination, to 30 per 100,000 with 5 deaths.

In the first half of 1941 there were but 3 cases in a million, and no deaths, among the soldiers.

Smallpox, once the great scourge, has been wiped out of the Army due to the vaccination of every man on his entrance into the service.

In 1918, in an Army of more than 2½ million, there were 625 cases and 6 deaths reported.

The incidence of the minor contagious diseases, such as measles, and mumps, have decreased appreciably. In November, 1917, the

rate of measles was 240 per 1,000, with a death rate of more than 5 per 1,000. Contrasted with the maximum rate in the new Army with 57 per 1,000 in March, 1941, and 1 per 1,000 at the present time.

The incidence for pneumonia for the Army in 1941 was one-half that which occurred in 1917. The death rate shows a startling reduction. In 1917—171 men died out of every 100,000. In 1941—only 8 men died out of every 100,000. This mortality reduction is, of course, largely due to advance in therapy. Recent figures reveal the incidence rate for t. b. in the 1941 Army was about 160 per 100,000.

In 1917 the Army rate for tuberculosis was 1300 per 100,000. This means that Army tuberculosis is only one-eighth as prevalent as in 1917. In the same period the disease has been reduced one-fourth for civilian population, but the Army reduction is twice that of the country as a whole.

It should be encouraging for mothers of service men to realize that in civilian life four times as many die of typhoid fever; nine times as many die of tuberculosis; ten times as many die of influenza, and two and a half times as many die of pneumonia. The soldier, aside from the casualties of battle, has better health and a higher life expectancy than his comrades of the same age group back in civilian life.

The soldier of today eats at the finest Army mess in the world. His individual ration costs Uncle Sam 48 cents a day, or $175.20 a year—an all-time high in Army budgeting. The World War daily cost of feeding a soldier was 26 cents.

The average healthy, hungry soldier eats about 5½ pounds of food a day. This ration contains about 4500 calories, which is an estimated 1500 to 3000 more than many a well-fed civilian adult receives.

Medical studies indicate that many American diets are deficient in calcium and phosphorus—but not the soldier's! His daily ration of milk (or cat's beer as termed by the soldier), is a certain safeguard against that lack.

The vitamin A in butter and milk is good for the eyes. Milk also contains the important vitamin B-2, and valuable minerals, fats, and carbohydrates.

We can learn something from other nations regarding health. In Russia, a child, before being admitted to school, must be vaccinated against smallpox, and must be immunized against diphtheria and

scarlet fever. We have a law which prohibits a child from entering school without having been vaccinated against smallpox. Immunization against scarlet fever and diphtheria is voluntary, although we know that diphtheria can be eradicated if every child of pre-school age were immunized.

We do not wish to emulate the radical German procedures. In that country a child is registered at birth with a record of its height and weight and physical condition. Each year that child is re-examined physically, and a record is kept until such time as the Government practically subsidizes the child's services. Exercise and nutrition are regulated. This is regimentation. A boy must necessarily serve in the Army.

There is no question in my mind that compulsory military service is most beneficial. I have always advocated it. The general policy of this country has been against it. We had a minimal standing Army before the national emergency. We are not a war-minded nation, and yet, if years ago compulsory military education had been the policy of this country, we would have been far more ready following the treachery of Pearl Harbor.

Two-year compulsory military training would be of great benefit to the boy. It teaches him discipline, self-sacrifice, initiative, self-reliance and makes him a better man.

Every one of you has seen the "before and after" appearance of the boys who are now serving with our Armed Forces—before they went to camp, and six months after they had been in military training. It is to be hoped that after this war we will not again be lulled into a dream of world peace, as we were with the Treaty of Versailles, but will maintain a requisite standing Army and demand compulsory military training.

Keeping physically fit is the duty of every man, woman and child. Health and welfare authorities have carried out extensive programs on hygiene and health education. Far too often these programs fall upon deaf ears. Our children at public and parochial schools are examined, parents are told of their physical defects and urged to have the same corrected. Facilities are available to have these deficiencies corrected without charge, if parents are unable to pay for the same, but the following Fall when school opens, a small percentage of defects have been corrected due to the laziness, disinterest and procrastination on the part of the parents. After the child leaves

school, goes to college or goes to work, the same indifference is far too frequently manifested.

We have been accused of being a nation of "softies"—this because of our luxurious manner of living—overeating and lack of proper exercise due to the extensive use of the automobile—the two-car garage for every family. This accusation of being a nation of "softies" can hardly be substantiated by facts. It is true that we have the highest incidence of diabetes of any nation in the world—a severe indictment—a condition which requires great thought. Diabetes in infancy and in childhood in the United States is far too high. One reason for this is that if two diabetics marry, their children will almost assuredly have diabetes in infancy—a fatal disease.

Our incidence of tuberculosis is disgraceful. Although the tuberculosis rate has decreased, yet the disease could be eradicated if we spend a sufficient amount of money to hospitalize the early cases as well as the late cases,—making segregation or hospitalization compulsory, as we do now with the incorrigible cases. Added to this would be the necessity of far more frequent case-finding programs, as we wish to institute at the present time—by extensive x-ray examinations of industrial workers, food handlers, domestics, and so extended to all walks of life.

Typhoid fever can and should be eradicated. There has been a marked reduction in the incidence of this disease, as related in Army statistics. Last year Philadelphia had the lowest typhoid fever incidence in the history of the City. The greatest danger of typhoid fever at the present time is the spreading of the disease by typhoid carriers.

And so we might mention the control of many other diseases, such as scarlet fever, diphtheria, pneumonia, infantile paralysis, appendicitis, (the mortality of which has been greatly reduced), goitre, cancer. All of these conditions can be reduced to a minimum, not by public education alone, but by taking advantage of the opportunities offered.

Possibly I have strayed too far from the subject of my paper as pertains to you. How can you keep physically fit for victory? By carrying out the suggestions that I have offered above.

First: What about exercise? I do not know very much about your curriculum, especially as it pertains to exercise. Do not neglect physical exercise. At a recent luncheon which I attended with your

President, Doctor William Harvey Perkins spoke on the question of exercise and decried morning sitting-up exercises, or, as he described, "jerking-up" exercises, and this is about what they amount to. Morning sitting-up exercise, with co-ordinated radio music, is a temporary fad. One usually starts with good intentions, but toward the second week you arise too late and the exercise is neglected, and so soon is forgotten. At best it is a poor substitute.

Strenuous exercise is applicable for those who have not as yet reached forty or forty-five—then it must depend upon the habits of the individual. It is my personal thought that strenuous exercise, such as tennis, horseback riding, fox hunting, can still be carried on by men even in their sixties, if they have been accustomed to strenuous exercise all their lives, and if they are told they can so do by a broad-minded physician. I have mentioned a "broad-minded" physician, because I have no great admiration for the "calamity howler", the physician who asks you what you like to do and then informs you that you must give up all of those things which you most desire because of your health—and there are many such doctors.

There are men in their later fifties and sixties who are in better physical condition than some in their early forties.

Retain outdoor exercise—some recreational hobby with which is associated mental relaxation. If you have insufficient time or money for some of the more expensive sports, walking is cheap and one of the best exercises there is. Walk part way to and from the park, or the whole way to or from your work, Watch the waist-line. This is of paramount importance. Far too frequently when we reach the age of forty we begin, notch by notch, to let out our belts. Eating is a habit—overeating is a bad habit and can easily be controlled. Overweight frequently is a forerunner of diabetes, and a fatty degeneration of the heart muscles.

These are strenuous times, probably as strenuous as the world has ever known. Don't put the almighty dollar as your goal in life. One, naturally, must live—one must save for the future, yet also remember that there will be no pockets in your shroud. You will be ferried over the River Styx without cost.

I am not a Doctor of Theology; therefore will not give you any words of admonition concerning your morals. I am sure that you

have had implicit instructions in this regard by your President, Dr. Ivor Griffith. I would not be as radical as Lieutenant Commander Tunney in his warning concerning the use of tobacco. It took three cases of cerebral concussion for me to give up smoking. Last September I had my third cerebral concussion, as a result of a fall from a horse. One Sunday a number of weeks thereafter, I met Dr. Hart, Rector of Valley Forge Chapel, who asked me how I felt. I told him that I was fine—had not had a drink nor had I smoked for three months. He replied "I do not consider that you had a fall, but rather that you were resurrected!" So we will skip the question of morals by making a bromidic remark—"Be moderate".

One word about worry. Worry is a dragon. Some days we have so much thrust upon us that we feel almost like Atlas carrying the responsibilities and weight of the world upon our shoulders. I do not know any truer axiom than nine-tenths of our worries are unnecessary. We are apt to worry and have sleepless nights over some incident which so frequently is imaginary and which, in the end, rectifies itself. Of course we have legitimate worries, but the man who brushes aside responsibility and worries, like Scarlett in "Gone With The Wind"—"I'll worry about that tomorrow"—is not the type that is needed so greatly in the world today. We now require men and women who complete their day's work to the best of their ability and at the end of the day, on that score, retain a clear conscience. We can only do our share in the present national emergency if we keep physically fit. We can only do our share by keeping faith with those who are battling for us in the four corners of the world.

You may remember those words were contained in the well-known poem written by the late Colonel McCrea of the Canadian Army, brother of the late Doctor McCrea, former Professor of Medicine at Jefferson Medical College. The title of the poem was "In Flanders Field". You also remember the last lines of the poem—

> "If you break faith with us who die
> We shall not sleep.
> Tho' poppies grow in Flanders Field".

It is sad to confess that faith has been broken with those who sleep in Flanders Field. Whereas you are going out at this time

when work will be plentiful, yet you are also entering a world distraught with chaos, presenting a discouraging picture. I can recall a psychiatrist remarking that if insanity increases in the next decade as it has in the past, eventually the insane will outnumber the sane and the insane will rule the world. I now wonder if we are not approaching that cross-road. Certainly abroad it seems to be true.

The time has now arrived when you are to go forth and serve. Your service will be as you make it. Your instructors in the Philadelphia College of Pharmacy and Science have finished their work. These professors have given of their time and effort to impart their knowledge to others of their profession, and you are of their profession. To you they have thrown the torch to be yours to hold it high.

There is but one suggestion which I have to make to you, and that is—never be afraid or ashamed to seek advice. Do not think it is a disgrace not to know everything. Remember that although you are graduating today, there is a great deal that you do not know. We must remain students all our lives. It has been said that when a physician ceases to be a student, he becomes a menace.

Each to himself must be his final rule—
Supreme dictator, to reject or use.
Employing what he takes, but as his tool—
But he who, self-sufficient, dares refuse
All aid of man, must be God or fool!

TABLET MANUFACTURING RESEARCH

The following article represents the thoughts of one actively engaged in tablet manufacture and research. Little information is available on this important subject, but the author points out the need for research carried on for the purpose of expanding our present knowledge and technic in tablet manufacture. Research, unhampered by the control laboratory or the production staff, is the only means of making real progress in the improvement of the quality of this important form of medication.

By George N. Malpass

THIS paper is not intended to be a detailed study of the various operations performed in tablet manufacturing, but merely an effort to outline methods of attack on the problems confronting the pharmaceutical chemist engaged in tablet research.

First of all, tablets are here to stay. Of all the classes of pharmaceutical preparations there is none which offers medicaments to the patient with greater accuracy of dosage or ease of administration. Formulae for many tablets are now official, and the list will continue to grow as time goes on.

Tablet manufacturing today constitutes the largest branch in many plants, but it is safe to assert that it does not obtain its proper share of research. Some establishments have well-set-up manufacturing laboratories in which real progressive research can be and is accomplished. Others have a halfway affair, acting only as a "trouble-shooting" department, to rectify mistakes and perhaps "cover up" those responsible for their occurrence, without making an effort to prevent their re-occurrence at some future date. Still others have no definite program of research, but continue with the old hit and miss "talc-slinging" methods, in which practically every worker in the department stands around and offers advice.

It is with the idea of perhaps encouraging work along more scientific lines that the following thoughts, based on years of active praticipation in this work, are presented.

Witness the paucity of papers on the subject, most of which have been written by students and educators, rather than by men engaged in practical work. There are several reasons for the dearth of literature.

First, the lack of willingness on the part of most manufacturers to publicize techniques of operation which perhaps have cost considerable time and money to develop, and which the manufacturer necessarily considers his "trade-secrets." Fortunately, this attitude is largely being replaced by one of industrial co-operation, chiefly brought about by the efforts of the several manufacturers' associations, so that interchange of ideas is much more prevalent today than it was a generation ago.

Second, lack of recognition of the importance of this phase of research. There are a number of manufacturers who annually spend huge sums on "pure research," or in the development of new medicaments. This is entirely worthwhile, but it is on the excellence of the products marketed that they must depend for the profits to support further research. Why is it, then, that so many establishments will railroad a new product through in the shortest possible time, allowing scant time to study either long time deterioration or manufacturing operations? Is it because the minute they "smell blood" they want to beat competition to the draw by being first on the market, using the first manufacturing formula which appears workable, rather than taking time to develop the *best* formula? Surely this is worthwhile research, which will pay immediate dividends in raising quality, lowering production costs, eliminating subsequent formula changes, and preventing spoiled goods.

Third, selection of qualified men for tablet research. An ideal staff would be headed by one who is qualified both by adequate education in pharmacy and chemistry, and with years of practical experience. He should be well versed in analytical control methods as well. Of the utmost importance is the ability to track down trouble, and to co-ordinate pure research with the various processes of manufacture. Unfortunately, there are but few men of sufficient education who are willing to spend the time and effort in obtaining the practical experience so essential to success. One may read about the fundamental operations practiced in tablet making, and may even view the procedures or carry them out under instruction, but unless he is put "on his own" will lack the "magic touch" when new problems present themselves. The assistant should be preferably an outstanding practical operator, one who can be relied upon to perform the various manipulations with the utmost skill, born of long hard years of experience. If appropriation permits another assistant, he should have

an engineering degree, or considerable mechanical ability, to assist in the selection of new equipment and to make a critical study of the mechanical processes employed.

A tablet research laboratory may be set up as part of a general manufacturing laboratory or as a separate unit, but most important of all, it should have the authority to make the changes that research indicates. Responsibility should be only to the chief chemist or plant superintendent. Too often good work is wasted by having some "office man" reject progressive change simply because he is not technically trained to the point of comprehension. Tablet research should *never* be subordinated to the head of the production department, who may use the laboratory primarily to further his own ends and carry out his personal whims. If he is the right kind of department head he will work *with* the laboratory, giving suggestions which may aid in ultimate solution of the problems he is experiencing in regular production. Process control is not the function of a tablet research laboratory, but of the plant control department. If control tests are indicated at various stages of processing, these should be made by the plant control laboratory. On research and development batches control tests should be made by the tablet laboratory, until such time as the formula is considered completed, after which the control laboratory can take over. This is mentioned to prevent the possibility of having a research center degenerate into a departmental control laboratory, wasting time in duplicating the work of the already established and utterly essential plant control laboratory.

How, then, should the research operator start off on a new problem?

First of all, he must study the properties of all the materials involved, and work out one or more general plans of formulation. He must satisfy himself that the basic formula is free from chemical or physical incompatibilities, or adjust manipulation to prevent interaction of antagonistic constituents.

He must then carry out on a small scale each operation of processing, in such a way as to simulate manufacturing conditions. These will be discussed briefly as they occur, in practice.

Selection of Materials—Strict attention must be paid to various grades and particle sizes of all materials used, as these will have considerable bearing on the outcome of the finished product. Close cooperation with the purchasing agent is essential to success.

Milling—The problem of reduction to particles of the required size can best be determined by the extent of the equipment at hand. Most milling conditions can be simulated by grinding small amounts in a mortar, or by the use of a Mikro-Pulverizer for somewhat larger amounts. Subsequent separation can easily be made by hand, or with one of the many mechanical shakers on the market. It is essential for the laboratory to have on hand screens and bolting cloth of all sizes. Tests should be made for specific density of powders, where variation is significant.

Mixing—One of the most important operations in tablet making, and one which is sometimes performed in a slipshod manner. Milling and mixing may be combined for development work by the use of jar mills, pot mills, the aforementioned Mikro-Pulverizer, or a small MacLellan tumbler. In large scale production mixing and granulating are usually performed continuously, in the same mixer, except in those formulae which require assay after dry mixing. These include combinations containing potent drugs, or materials of widely different densities, which may not readily adapt themselves to dry mixing.

Granulating—This is a difficult operation to approximate on a laboratory scale. Perhaps the best method is hand granulating, although small mechanical granulators have been devised to imitate the work of large scale equipment. Here the operator has a wide range of materials from which to choose his binding agent. Skill and experience will limit the choice to the several agents most likely to possess the desired result, which can then be tried as preliminary experiments. Many formulae adapt themselves to dry compressing, or "slugging." Here again, it is difficult to simulate the action of large scale precompressing equipment, but with a little ingenuity the operator will be able to determine the possibility of success by this method of granulating, even with small amounts of material.

Drying—More attention is being paid this operation than ever before. With the advent of efficient air-conditioning units most formulae can be dried at a lower temperature and shorter time interval than ever before. It is important that the research operator not only study drying conditions thoroughly, but that he correlate his results by moisture determinations made on the dry granulations. Drying conditions encountered in plant operation must be duplicated accu-

rately in the laboratory if variations are to be avoided. Small electric dryers with thermostatic control may be used for small experimental lots, but in the development of a formula to larger quantities of material (10-20 lbs.), regular production equipment should be used.

Dry Screening—Perhaps more good granulations are ruined in this step than at any other point in processing. Several types of mills are used for large scale production, some combining the operation of sifting with the particle size reduction. Hand screening in the laboratory is only a rough approximation of actual conditions in the plant. A small coffee mill is perhaps the best laboratory unit for small scale work. In the intermediate stages of formula development every effort should be made to use the equipment in the production centers. A fair time limit must be set up, so that material will not be fed into the mill too rapidly. The mesh size must be governed by the size of the tablet to be made, the speed of the mill, and the hardness of the granulation. Here no set rule can be made, as materials will differ greatly in handling. The best plan is for the operator to control the operation by making mesh tests on each lot until the desired point has been reached.

Lubrication—Some manufacturers add disintegrators and lubricants at the time of dry screening. Others wait until the granulation is ready for compressing. This is a matter of choice, based on whether the formula in question is in continuous production or an occasional line waiting its turn on the compressing machines. Here again the research operator has a wide choice of materials which may be used. He must select the most efficient, and use it in the smallest amount required to do a good job. In the old days it was customary to "add talc" when granulations stuck on the machines. There is a more scientific approach than this. The difficulty may be due to excessive moisture, lack of sufficient lubricant, poor choice of lubricant, or may be mechanical. No formula should ever be considered finished if all difficulties have not been worked out. The idea of "doctoring up" a formula to meet emergencies is not based on firm footing. If such an occasion arises, the formula should become a number one problem, until it is licked and stays licked. Only in this manner can a formula be finally standardized to the point of absolute uniformity, but it *can* be done. A small coating pan is ideal for laboratory work at this stage of processing.

Compressing—Preliminary work may be done on a research lot by means of single punch machines. Larger pilot size runs should always be made on the machines that will eventually be used in producing the particular formula developed. The research operator must be satisfied that the friability and disintegration of the tablets produced meet the specifications, and that the mechanical operation is entirely satisfacory. All compressing machines should be equipped with speed controls, and the proper operating speed worked out for each formula.

Tests on Finished Products

Hardness tests may be made with one of several mechanical testers developed, but the results are subject to considerable variation, especially when applied to tablets made on multiple-punch machines, in which instances miscroscopical differences in punch lengths and irregularities in feeding may produce varations in the hardness figure. A skIled operator's touch is usually of sufficient accuracy, although a tester may be used to advantage in obtaining readings with different batches of the same formula, for the purpose of comparison. In any event, mechanical testers are not foolproof, and results obtained with them must be studied with caution.

Disintegration tests are important, and may easily be made by suspending a few tablets in artificial gastric juice at body temperature, with gentle agitation, noting the time elapsed for complete disintegration. Some manufacturers make a point of advertising disintegration within a few seconds (where this is easily attained), yet there are but few formulae in which complete distintegration in less than 30 minutes is really required. However, all tablets except those designed for absorption in the intestinal tract should be completely disintegrated in this time. While the process of coating is not included in this paper it may be mentioned that research has already produced sugar coating which disintegrates very rapidly, so that the total disintegration time for a coated tablet may not be much longer than for the same tablet uncoated. Of equal importance is the effect of time on the hardness of the tablet, and its relationship to disintegration.

Routine stability tests should be set up, exposing samples of finished tablets to varying conditions of temperature and humidity, in order to accelerate decomposition. Samples should be exposed in open containers and also in the packages which will be used for marketing

the product. At frequent intervals the following points should be checked with a sample kept under normal conditions—color, hardness, disintegration, and assay for activity.

During production runs weights are usually checked by weighing groups of tablets at frequent intervals. This system is not adequate for control purposes. After groups of tablets have been weighed, a number of individual tablets must be weighed and the extreme variation calculated. The reason for this is obvious. A group containing both light and heavy tablets could well have an average within the allowable tolerance, yet individual tablets might pass far beyond the limits.

Moisture control is desirable in all formulae, and essential in many. Valuable data can be accumulated by sampling at various stages of processing and making a moisture determination by any of the standard methods which are applicable to the materials comprising the formula. On many tablets, particularly effervescents, it is important to assay the finished tablet for moisture, as well.

It is superfluous to state that detailed notes of every experiment should be kept, and that all observations, however minute or seemingly insignificant, should be recorded. Every research chemist knows and does this. However, if one keeps an up to date file of new materials likely to be found useful, and of the properties of newly discovered medicinal substances, it will be found a valuable and convenient source of reference for items too recent to appear in standard reference works.

Summary

Th primary purpose of a tablet research laboratory is to develop a formula to the point at which it can be processed regularly without recourse to change.

The correct approach is to first make small laboratory size runs using small equipment designed to simulate manufacturing operations, studying each operation individually, making corrections where necessary.

This should be followed by small pilot lots processed by the laboratory staff, but using plant equipment.

Further experimental batches should be processed by the manufacturing staff, under supervision of the research chemist, until a standard workable and unvarying procedure has been assured.

After exhaustive stability tests the formula can be said to represent the best attainable, and is ready for adoption.

Control tests should be made in the tablet research laboratory only during development of the formula, afterward by the Plant Control Laboratory.

Most important of all, the research effort must not be hampered by the production staff, or by "red tape," but the chemist must have complete freedom of action, as well as responsibility for the results.

If these principles are followed, the quality of the tablets produced is certain to be improved, and production losses cut to a minimum. The results will more than justify the expenditure, if high quality goods are desired.

Pharmacists Warned to Expect Variations in Strength of Digitalis Preparations With Advent of New U. S. P.

The Food and Drug Administration has issued a statement to the effect that studies indicate a considerable reduction in potency of Digitalis and its preparations with the adoption of U. S. P. XII standards. Although the exact reduction is not predictable, the data indicate that it will amount to 40 per cent. or more in at least one-half the cases.

Inasmuch as the potency of Digitalis is such an important factor, a change of this magnitude is of the greatest interest to both physicians and pharmacists. It is suggested that during the transition period in which U. S. P. XI and U. S. P. XII products may both be available, conspicuous notice of the reduction in potency be given on the labels.

Phenol-Camphor for "Athlete's Foot"

The publicity given the phenol-camphor treatment of "athlete's foot" by *Reader's Digest* has caused many inquiries as to the formula used. The original article in the *J. A. M. A.* (Dec. 6, 1941) recommended 3 parts of phenol and 1 part of camphor, although equal parts are satisfactory.

It is absolutely imperative that phenol crystals be used and *not* liquefied phenol, since the presence of moisture causes the phenol to be caustic. It is likewise necessary to thoroughly dry the affected parts before applying the preparation, as otherwise it will be irritating or cause tissue damage.

A recent ruling of the Food and Drug Administration has classified this preparation as a dangerous drug to be sold only on a physician's prescription.

SODIUM HEXAMETAPHOSPHATE AS AN ANTICOAGULANT

A Preliminary Study

Sodium Hexametaphosphate forms complex salts with calcium which ionize so poorly as to yield no precipitate with soluble oxalates. The possibility of using this chemical as an anticoagulant for blood and milk has been considered and some interesting results are presented suggesting the feasibility of such use. Further experiments including toxicity studies are in progress.

By Saul Caspe and L. G. Hadjopoulos

MEDI-CALGON is the commercial name for the purest class of sodium hexametaphosphate $(NaPO_3)_6$ produced in the U. S. A. It is recommended as water softener and dish wash (1), as a repressor of perspiration (cosmetic use) (2), and as treatment for certain occupational dermatosis (3). Medi-Calgon operates by sequestering calcium ions to form complex double salts in which the complex calcium anion exhibits a low order of calcium ionization. The soluble complex salt formed is believed to be $Na_2(Ca_2P_6O_{18})$. The calcium in the anion $Ca_2P_6O_{18}$ is so tightly bound that even ammonium oxalate fails to precipitate this type of calcium.

A survey of blood anticoagulants reveals a few isolated substances and a paucity of information about their pharmacological and physiological properties.

The most commonly used anticoagulant is sodium citrate. It forms double salts with calcium which inactivates the ionization of calcium. Sodium citrate does not work in vivo, in fact it coagulates blood when injected intravenously. The citrate is believed to injure blood platelets with a consequent liberation of thromboplastin, which constitutes an explanation of the mechanism by which this apparently anomalous activity occurs. However, the citrate works in vitro i. e. it delays coagulation of shed blood. Salant and Weiss (4) report that 1:100 sodium citrate inhibits coagulation of rabbits' blood 4 days, but hemolysis follows, and hemolysis is complete in 6 days and then within 8 days the blood was black and completely clotted. These authors also report that the fatal intravenous dose of sodium citrate

for rabbits is between 0.4 to 1.6 grams per kilogram. They observe that 70 mg. sodium citrate per kg. may produce toxic symptoms, and 115 mg. per kg. injected in one minute may produce severe toxic symptoms. Thirty mg. sodium citrate per kg. depresses heart muscle and stimulates vasomotor center in dogs.

Heparin, the name of a purified liver extract is an anticoagulant which works both in vivo and in vitro. There may be violent reactions to its intravenous use unless the heparin is adequately purified.

Blood anticoagulants can be divided into at least two operational classes: (1) one class increases the antithrombin concentration of the blood, and (2) the other class inactivates blood calcium.

The importance of blood anticoagulants is made manifest because of the extensive world war, and the incurring necessity of transporting huge quantities of blood over difficult terrain, accompanied by widely changing climatic conditions, and at times poor facilities for proper refrigeration. It is believed that sodium hexametaphosphate because of its previously described calcium sequestering properties might prove to be an ideal anticoagulant. Because of the timeliness of this study, we now report our preliminary findings.

Experimental

The arterial blood of a rabbit was taken and its coagulation time determined by capillary tube as well as glass slide method. The coagulation time was 5.5 minutes. A 10% sodium hexametaphosphate * solution was then injected into the marginal ear vein of this rabbit 1 cc. per kg. The rabbit went into shock and was revived by artificial respiration and heart massage. Ten minutes after this injection, the arterial blood was taken and its coagulation time was 32 minutes or almost six times as long as normal. In 50 minutes, the freshly drawn arterial blood coagulated in 6 minutes.

Arterial blood was withdrawn from another rabbit and 0.5 cc. was placed in each of two test tubes, one tube containing 0.5 cc. physiological saline, the other 0.5 cc. 10% sodium hexametaphosphate. The tubes were placed in a refrigerator at (approx.) 10° C. The results are given in Table I.

* The Sodium Hexametaphosphate was generously given to us by Calgon, Inc.

TABLE I

SODIUM HEXAMETAPHOSPHATE 5:100 AS ANTICOAGULANT

Rabbit Blood 0.5 cc.	Observation	Time
in 0.5 cc. physiological saline (control)	Complete coagulation	6 min.
in 0.5 cc. sodium hexametaphosphate	No hemolysis—no coagulation	120 hrs.
in 0.5 cc. sodium hexametaphosphate	Slight hemolysis—no coag.	168 hrs.
in 0.5 cc. sodium hexametaphosphate	Slight hemolysis—no coag.	192 hrs.
in 0.5 cc. sodium hexametaphosphate	Increased hemolysis—no coag.	216 hrs.
in 0.5 cc. sodium hexametaphosphate	Almost complete hemolysis—no coagulation	312 hrs.
in 0.5 cc. sodium hexametaphosphate	Almost complete hemolysis—no coagulation	432 hrs.

4.5 cc. of venous blood was withdrawn from a normal human adult and poured into a test tube containing 0.5 cc. of 10% sodium hexametaphosphate. Kept in a refrigerator at (approx.) 10° C. Results are given in Table II.

TABLE II

SODIUM HEXAMETAPHOSPHATE 1:100 AS ANTICOAGULANT

Human Blood	Observation	Time
Sodium hexametaphosphate 1:100	No hemolysis—no coagulation	72 hrs.
Sodium hexametaphosphate 1:100	Very slight hemolysis—no coagulation	96 hrs.
Sodium hexametaphosphate 1:100	Slight hemolysis—no coag.	144 hrs.
Sodium hexametaphosphate 1:100	Slight hemolysis—no coag.	192 hrs.
Sodium hexametaphosphate 1:100	Slight hemolysis—no coag.	240 hrs.
Sodium hexametaphosphate 1:100	Slight hemolysis—no coag.	264 hrs.
Sodium hexametaphosphate 1:100	Slight hemolysis—no coag.	312 hrs.

Preliminary Hemolysis experiments were performed as follows: One drop of human blood was added to a series of test tubes containing 1 cc. of a solution of sodium hexametaphosphate in various concentrations.

TABLE III

PRELIMINARY FRAGILITY TESTS

Amt.	Concentration of sodium hexametaphosphate	Blood added	
1 cc.	0.1%	1 drop human blood	complete hemolysis
1 cc.	0.2%	1 drop human blood	complete hemolysis
1 cc.	0.3%	1 drop human blood	complete hemolysis
1 cc.	0.4%	1 drop human blood	complete hemolysis
1 cc.	0.5%	1 drop human blood	complete hemolysis
1 cc.	1.0%	1 drop human blood	almost complete hemolysis
1 cc.	2.0%	1 drop human blood	partial hemolysis
1 cc.	3.0%	1 drop human blood	slight hemolysis
1 cc.	5.0%	1 drop human blood	no hemolysis

Addition of 0.5 to 1% glucose decreases hemolysis.

TABLE IV

Sodium Hexametaphosphate as Milk Anticoagulant

Bottle	Contents	24 hrs.	48 hrs.	72 hrs.	96 hrs.	120 hrs.	216 hrs.
A	25 cc. milk and 0.3 cc. sod. hexametaphosphate	fine curd	fine curd	sweet taste	slightly sour	slightly sour	slightly sour
B	25 cc. milk and 1.0 cc. sod. hexametaphosphate	fine curd rises to top	fine curd delicate & soft, sweet	sweet taste	sweet taste	very slightly sour	fine curd slightly sour
B[1]	25 cc. milk and 1.0 cc. sod. hexametaphosphate						
C	25 cc. milk control	heavy curd homogeneous	heavy viscous curd, sour	sour	very sour	very sour	heavy gummy curd, very sour

There is a titratible difference in total acidity, and a qualitative difference in lactic acid.

Sodium hexametaphosphate was tried as an anticoagulant for milk and milk products.

The preliminary results are reported in Table IV.

Four bottles were filled with 25 cc. of fresh milk and into one was placed 0.3 cc. and into two others was placed 1.0 cc. of a 10% sodium hexametaphosphate. The last bottle was untreated and served as control.

We are reporting these preliminary tests but much more complete experiments are in progress now. It will also be necessary to determine the toxicity of sodium hexametaphosphate.

The fragility tests indicate that it is necessary to use a very high concentration of sodium hexametaphosphate but it is possible to overcome this defect by not diluting the blood too much. By referring to Table II it is obvious we accomplished this result. You will note that there was no hemolysis where sodium hexametaphosphate 1:100 is used and the amount of water added to the blood is negligible.

Summary

1. Sodium hexametaphosphate is an excellent blood anticoagulant.

2. It acts as an anticoagulant in vivo and in vitro. It gives comparable results for rabbits' as well as human blood.

3. Preliminary experiments indicate that it is a milk anticoagulant and that it modifies the end products of the souring of milk.

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THE PLAIN FACTS ABOUT HONEY

The first thought of many people upon the advent of sugar rationing was nature's oldest sweet, honey. The demand upon the lowly bee far exceeds its capacity and, although the industry might expand in given time, a return to the abundant days of peace would cause a collapse of this artificial market.

By T. Swann Harding

SO when sugar gets short you think maybe you can buy yourself a perfect mess of honey and sweeten things up about as usual. Well, don't count on it. For one thing, the ice cream and the soft drink makers saw that one coming and they are trying to corner the honey market now with prices rising all over the place. It looks as if some sort of rationing at the wholesale level will have to be instituted to control them.

For another thing, while our normal consumption of sugar is from 100 to 104 pounds a head in the United States, our normal consumption of honey is just about one and one-half pounds a head, so the bees can't make up the deficit in sweets. What the devil do you think a bee is, anyway? They don't exactly secrete honey. The beekeeper doesn't milk them when they come home at night. You've heard about the bee's knees, but never a word about her udders, or have you?

A bee is a peculiar thing which has several legs, some wings, and a stinger, and he spits on his fins or whatever it is, lights out like a small airplane, digs his nose into a lot of flowers, sucks up nectar and packs it away on his hips, wipes his feet all over the blossoms and gets them full of pollen, and then hightails it for home with the throttle out. Once he gets there, and he always has the hives, and if he doesn't you just might as well not have gone into this business in the first place. He deposits the honey, gets a check from the timekeeper and a drink of water, and then hikes out again after more honey. When he lands he is full of pollen, too. It is possible to arrange a pollen trap so that he has to pass through it on entering the hive in which case the pollen can be collected. Pretty soon that might become worth while too, what with the Germans sucking daisies and the British out after rose buds to get vitamins. For pollen runs very high in pantothenic acid, which is not as bad as it sounds but is actually a vitamin.

Does that begin to give you a bee line on this honey business? Would you think it possible for the bees in the 4½ million hives in this country to produce 206,591,000 pounds of honey a year to keep half million or so beekeepers alive? Well it is possible, for the bees did that in 1941, and production in 1942 could probably be stepped up to 250,000,000 pounds,—or a little more, if the bees were encouraged and the beekeepers got their sugar. California is our leading honey-producing state.

Now don't get any wrong notions in your pretty head about that sugar. Yes, it's a fact, the beekeepers feed the bees sugar, but they do it only when the cunning little animals would otherwise starve to death. For a bee starves mighty quickly. He can only live about twenty-four hours without food and sometimes not that long. Very often his stored food runs out before the spring nectar starts to flow, so the apiarist (we're getting upstage now but that's still the beekeeper) lets a dish of sugar syrup set around in the hive for the bees to eat, or drink, or what have you.

That keeps the bee from starvation. But bees will not eat sugar when they can get nectar. Besides it is both illegal and uneconomical for beekeepers to feed bees sugar for honey production. To make a paying thing out of it, for the keeper at least, the bee must get a cheaper source of nectar than refined granulated sugar and that the bee demands or none. Brown sugar gives him dysentery and he loses interest in life and gets a far-away look.

Now the bee can turn granulated sugar into honey. He has an enzyme in him enabling him to do that. (I should say "her" of course but a worker bee is much nearer an "it" than anything sexual so let's compromise on "him.") An enzyme is something that promotes and sets up a chemical reaction without taking part in it. Thus while the nectar is en route from the blossom to the hive in the bee's hip pocket this enzyme turns it into honey.

Honey consist of two sugars, dextrose or glucose and levulose or fructose. The second sugar is very much sweeter than ordinary cane sugar; the former considerably less sweet. But the two together make honey as sweet pound for pound as cane sugar. Since honey contains 17 or 18 per cent. of water that means that the sugars in it actually are about one-fifth sweeter than ordinary table sugar. Hence the giving of sugar to bees is a double investment.

If the sugar saves the life of the hive, and it may take 10 or 15 pounds to turn the trick, the bees will produce 300 to 400 pounds of

honey. That is a good return on the sugar invested already, but the fact that the sugar produced is sweeter than the sugar invested adds an additional chemical stock dividend not to be ignored. On the other hand if the hive runs out of stored food before nectar is available and the beekeeper has no sugar to feed the bees they all disconsolately die and there is no honey. Beekeepers will get the sugar they need.

That is why the apiarist must have his sugar. He also needs rubber tires, like any other farmer, and he will get them, like any other farmer. He will get tires for trucks used to take his product to market and to bring back raw materials used in making his product, but he will get none for pleasure cars or for trucks used to deliver his produce to consumers.

Finally, like a lot of other food manufacturers, the beekeeper needs containers. He will almost certainly get tin for containers from the 5-pound size up. Glass is perfectly all right for smaller containers and it is probable that beekeepers could get along very well if they had tin only for their containers sized from 60 pounds up. Of course, strictly speaking, the beekeeper is not the food manufacturer in this case, which brings us back to the bee.

If our vitamin requirements became acute it would be possible to scrape 100,000 tons of pollen off the bees of the United States and to process it for pantothenic acid. The bee carries quite a load, you see. Some time ago it was discovered that the peculiar glandular secretion which worker bees feed to queens is very high in pantothenic acid. More recently the vitamin has been found in considerable quantity in pollen whence the workers may derive it.

But the honey-making business is a side line insofar as the bee's status as a useful citizen in a democracy at war is concerned. For the bee is the great pollinator and any number of our fruit trees, cover crops, range grasses, and vegetables would be sterile and useless without bees to pollinate them. The bee does a better job of that than any other insect and, as a matter of fact, modern insecticides have thinned the other insects out considerably.

It has been calculated by statisticians, persons with a careful eye for non-legged figures and an indifferent attitude toward facts, that bees are from 10 to 30 times more valuable for the pollination work they do than for the honey they produce. That calculation happens to have a strong basis of fact, too. Since we are this year under-

taking the greatest and most carefully planned farm-production program we ever attempted, maintenance of the bee population may be a strong factor in success.

The little animals also can be used to make wax. The United States uses about eight million pounds of beeswax annually of which five million are imported. Getting the bees to produce more wax is quite simple if somewhat unethical. You simply steal their combs before they get a chance to put any honey in them and they make more combs.

Well, anyway, the bees must have the few thousand tons of sugar they require. How much sugar an individual beekeeper will need depends upon weather conditions, the nectar flow, whether he rears queens, or whether he is in the commercial package-bee industry. The last two greatly increase sugar requirements.

Furthermore honey must be kept on consumer tables. Manufacturers who use large quantities of honey in wartime will not use it any longer when peace comes. They will return to ordinary sugar which is cheaper. Apiarists should not expand their business unduly on so insubstantial a basis. Consumers really need honey in their wartime ration. So don't you go out and buy honey to hoard. The Government will attempt to restrain the greed of the big fellows.

Bees for victory. Keep a tame bee and milk it regularly!

OUR CONTRIBUTORS THIS MONTH

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SELECTED ABSTRACTS

From the Current Scientific Literature

Bactericidal Effect of the Paraffining of Paper-Board Used for Paper Milk Containers. F. J. Moss, R. C. Thomas and M. K. Havens. *Public Health Reports,* May 2, 1941. This paper interestingly enough points out that the use of paper containers for fluid milk dates back as far as 1905. However, this innovation did not come into extensive commercial use until 1929-30. At that time the use of the paper container was confined mostly to the wholesale distribution of milk. Recently, however, two of the larger milk companies in New York City have started to use two-quart paper milk containers for retail delivery. It is quite obvious that the methods used for the bactericidal treatment of glass milk bottles are not generally applicable to the bactericidal treatment of paper milk containers, practically all of which are paraffined. It was the purpose of the workers in this study to obtain data to determine temperature and time combinations of paraffining that would provide adequate bactericidal treatment of the surfaces of these containers.

Because of the fact that paraffin is an anhydrous substance, any factors which affect the moisture content of the paperboard and especially the surface moisture at the time of paraffining would influence the bacterial reduction due to the paraffining treatment. Some of the factors which would come into play in carrying out a study of this type are (1) the original moisture content of the paperboard and (2) of the bacterial culture used, (3) drying time that occurred between application of the bacterial culture and subsequent paraffining of the paperboard. Thus the temperature and relative humidity at which the paperboard is stored will naturally vary the moisture content. Since cultures of E. coli, the test organism used in this work, vary in their thermal resistance, a particular strain was used whose thermal resistance was such that a twenty-four-hour skim milk culture in sterile milk showed a 99 per cent. reduction (initial count one million colonies per cc.) at 140 degrees F. for twenty

minutes, the temperature and time combination taken as lethal for the most heat resistant pathogens transmissible through milk supplies. Consequently, the experimental work resolved itself into determining the temperature and time combinations of paraffining required to produce a 99 per cent. reduction of the strain of E. coli that was used. The experimental procedure used in the study is adequately explained while the results and discussion thereof are illustrated with numerous simplified graphs.

Under the test procedure followed in this study, a mean 99 per cent. reduction of the E. coli test organism due to paraffining was obtained in about ten seconds at 180 degrees F., twenty seconds at 175 degrees F., thirty-five seconds at 170 degrees F., two minutes at 165 degrees F. and four minutes at 160 degrees F. From these results it would appear that the higher the temperature used in the paraffining process the greater the bactericidal efficiency, unless the inversion times generally used are considerably increased. If the use of the higher paraffin temperatures is impracticable, it may be necessary to subject the containers to separate bactericidal and waterproofing treatment or provide means for increasing the bactericidal effect of paraffining such as passing the paperboard through hot air of high humidity. This is done in order to render the surfaces of the paperboard sufficiently moist to facilitate bacterial reduction by paraffining without interfering with the other functions of paraffining.

E. A. M.

Sulfathiazole Locally in Colds. R. S. MacArthur. *Clinical Medicine, 49,* 101 (1942) No. 4. The author describes a 3 per cent. sodium sulfathiazole water-soluble jelly, in a sealed collapsible tube. The tube with an applicator is so constructed that the patient receives a measured dose of 7 minims of the jelly in each nostril. This was developed as the result of research showing the value of sulfathiazole locally in colds. The treatment is carried out three times a day. With this therapy sequelæ, such as laryngitis and bronchitis, do not develop. Where pharyngitis or bronchial irritation have already begun sipping 1 cc. of the jelly will relieve the distress. The average dose of sulfathiazole in each nasal application is about one-fifth grain and in each cc. about one-half grain.

The Typhoid Carrier Problem. W. Saphir, W. Baer and F. Plotke. *J. A. M. A. 118,* 12 (1942). Typhoid fever carriers are important problems medically and economically. It has been estimated that as many as 44 per cent. of all cases of typhoid are due to carriers. The first authentic typhoid carrier in this country, Typhoid Mary of New York, had 51 cases of typhoid and three deaths attributed to her. At a recent symposium it was agreed that during the past 5 years no cases of typhoid due to contaminated water supply had occurred in New York state while carriers have been held directly responsible for a large proportion of the cases. In general, all typhoid carriers felt remarkably well when observed clinically. No lowered resistance or increased susceptibility toward infection were noted.

Uhlenhuth states that 80 per cent. of typhoid carriers are adult females and carriers do not have the same life expectancy as a person of the same age in general population. The carriers were classified into bile, intestinal, and urinary types.

Therapeutic observations were made with soluble iodophthalein. Treatment with sulfaguanadine has been administered with curative results. Sulfaguanadine in five cases had no effect on the bacillary excretion in the stool. The oral treatment with soluble iodophthalein of 65 bile carriers sterilized the bile in 32.3 per cent. and freed stool from typhoid B in 7.6 per cent. of carriers. Once the typhoid carrier is detected, the problem resolves itself into the question of whether the carrier should be treated or just controlled.

The Misuse of Sulfonamide Compounds. F. W. Taylor. *J. A. M. A. 118,* 12 (1942). Wih the general acceptance and use of the sulfonamide compounds it is inevitable that they should be tried in many types of infections for which they are not considered specific. Treatment with sulfa drugs in certain pernicious surgical practices include (a) the "prophylactic" implantation of one of the sulfonamide drugs in clean operative wound or any wound which is to be closed and (b) the local implantation of one of these drugs at the site of an appendectomy or appendical abscess.

Sulfonamides are quite irritant to the tissues. When placed in the tissues in powder form, they cause an inflammatory reaction in

those tissues. They undoubtedly damage or even kill cells with which they come in contact. The implantations of a sulfonamide powder at the site of an appendectomy is also questioned. This practice cannot elevate the concentration of the drug at the distant peritoneal pus pocket above that obtainable by systemic administration.

Adhesions may result from application to bare peritoneum. These procedures give the surgeon a false sense of security, to the detriment of sound surgical judgment.

Deciphering Charred Documents: Some Recent Work and a New Method. J. Grant. *The Analyst, 67,* 42-46 (1942). Many factors affect charring and the method to be used in the deciphering of documents. The type of paper and ink used is important. In criminological work the document must be preserved in an unchanged state for use as evidence.

Recent methods are classed into two categories. (1) Methods which depend on existing contrast between remains of ink and paper.

(2) Methods in which contrast does not exist but may be developed.

Chloral Hydrate Method—The specimen is treated with a 25 per cent. solution of chloral hydrate in alcohol and dried at 60 degrees C. This is repeated until a mass of chloral hydrate crystals forms on the surface; a similar solution containing 10 per cent. glycerin is then applied and the document dried as before. Carbon inks give the best results; aniline and photogravure inks behave least satisfactorily.

Silver Nitrate Method—The specimen is treated with a 5 per cent. soln of Silver Nitrate, and after three hours the writing becomes visible as a black image against a grey background and can be photographed. Printed matter gives the best results; writing inks are only moderately good.

Reactions with Iron—Most writing inks leave a residue of Iron oxide on paper after being subjected to heat. Possible reagents are

Ammonium Sulfide, Tannic Acid, and Potassium Ferrocyanide. The last is preferable because it produces the greatest contrast. Paint the document with a dilute solution of Potassium Ferrocyanide in 2 per cent. HCl. Prussian blue forms from the iron in the ink residue. The main disadvantage is that many papers contain a trace of iron and a uniform blue might result.

Infra red Photography—The equipment is relatively simple, although the method is not always successful. If not successful other methods may be employed.

Photography with Visible Light—(1) The charred specimen is placed between two photographic plates. The gases which diffuse slowly from the charred paper fog the emulsion, except where the residue from the ink hinders escape. After 2 weeks the plates are developed.

(2) The flat document is photographed in the light of a small arc, with a narrow beam of light on the specimen. A high contrast blue sensitized plate is used.

Fluorescence in Ultra Violet Light—The sample is placed on a flat plate and saturated with a mixture of equal volumes of mineral oil and petroleum spirit. The solvent is allowed to evaporate and after a period of about one minute the specimen is flattened out and all surplus oil is removed with blotting paper. The specimen is then examined under the ultra violet lamp.

SOLID EXTRACTS

Pertinent notes for the readers' note books

Night fliers of war planes require large amounts of vitamin A which is known to be essential if keen vision is to be maintained under conditions of poor visibility. Another useful practice is to pre-condition night fliers in total darkness before sending them out on their important mission. By such methods the vision is so acute that enemy targets are frequently visible even when "blacked out."

AJP

With every pound of sugar saved enough alcohol can be made to process one pound of smokeless powder. Every time a sixteen-inch gun is fired the sugar yield of a fifth of an acre of sugar cane is required. Alcohol is all-important in war time and sugar is one of its precursors. Rationing of sugar makes adequate supplies of alcohol available, insures a fair and equitable civil distribution and will probably be a beneficial thing for healthful living.

AJP

Tests by Army engineers show that deep red, not blue, is the safest light for use during blackouts.

AJP

The amount of paint required to cover certain large structures seems almost unbelievable. The San Francisco-Oakland Bay bridge requires 75,000,000 gallons. It takes 38 painters working 40 hours a week nearly 5 years to do the job. It is also said that a 10,000 ton cruiser requires almost 100 tons of paint for her hull.

Hygeia has recently confirmed what anyone might observe "that there is no known relationship between intelligence and the presence or absence of wisdom teeth." In our opinion the mere fact that anyone believing such rot himself possessed 32 teeth was proof of its falsity.

AJP

The recent decision to reduce the variety of shades, colors, sizes, etc. of cosmetics as a means of conservation has, unfortunately, been misinterpreted by some of the fairer sex as requiring them to abstain from the use of cosmetics for patriotic reasons. This is far from the truth. Women are, generally speaking, seeking ways and means to help in the national effort and they have a somewhat higher level of willingness to sacrifice than do men. It is our prediction that men would probably lose morale if they suddenly were forced to look upon the women of their choice without benefit of cosmetology and women likewise would upon glancing in their mirrors begin to suffer an inferiority complex.

AJP

The Conservation Order on quinine issued by the WPB has recently been amended to include Totaquine, the new U. S. P. XII product which represents a mixture of cinchona alkaloids. This was done in order to avoid an evasion of the original order.

AJP

It is now understood that stocks of quinine totalling less than 50 ounces are exempt from the order and may be used for any purpose. Additional stocks may not, however, be acquired except for use as an antimalarial.

BOOK REVIEWS

Two New Volumes Are Brought to Your Attention

The Blood Bank and the Technique and Therapeutics of Transfusions. By Robert A. Kilduffe and Michael DeBakey. 558 pages, 214 illustrations, and one color plate. Price $7.50. The C. V. Mosby Company, St. Louis, 1942.

This is a timely volume. Covering as it does the entire field of blood transfusion, it is of especial value during war times. The subject matter in 16 chapters is presented in a comprehensive manner, yet maintaining the functions of expediency and practicability. The first chapter details the development of blood transfusion, followed by chapters on rationale, indications and contraindications, one on the military aspects and another on special types of transfusion. The chapter on blood typing and compatibility tests serves well as a laboratory guide for the technique of such methods. Following are chapters on anomalous blood typing reactions, the "universal donor" and the "universal recipient," the blood bank, changes which occur in stored blood, biochemical changes, operation of a blood bank, plasma transfusion, preparation and preservation of citrated plasma and of concentrated and dried plasma, methods and technique of transfusion, and complications of blood transfusion.

The bibliography is varied, representative, and listing approximately 2900 published articles, can serve well as a valuable reference source for this subject. This volume is highly recommended to those interested in all phases of blood transfusion or in the establishment and management of blood banks.

LOUIS GERSHENFELD.

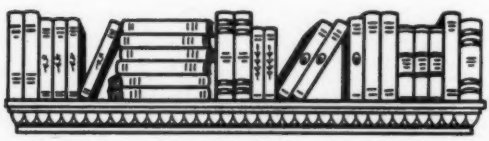
Synopsis of Materia Medica, Toxicology and Pharmacology. By Forrest Ramon Davison, B. A., M. Sc., Ph. D., M. B., Medical Department, The Upjohn Company. (Formerly Assistant Professor of Pharmacology in the School of Medicine, University of Arkansas.) C. V. Mosby Co., St. Louis, Mo. Second Edition. 695 pages, including index. Price: $5.75.

This pocket size text (8 x 5) was written primarily for students and practitioners of medicine, but its concise style and disregard for pharmacology of the abstract variety makes it a very useful reference for anyone interested in finding pertinent facts quickly about a given drug. The book is arranged on the basis of drug action and the author is to be complimented for his consideration of drugs on the basis of their actual value rather than whether or not they are officially recognized or included in the N. N. R. The new titles of the U. S. P. XII and N. F. VII have been included which greatly adds to the up-to-date quality of the work.

Pharmacology as a science and laboratory study has its important place in the field of medical research, but the busy physician and pharmacist rarely have time to explore this labyrinth. As a consequence, a condensed work such as this, emphasizing utility and stressing where, when, and how it probably answers his need, should appeal to the majority of such practitioners.

Close examination of the text by this reviewer has not resulted in any serious criticism and it may be recommended as a useful handbook for physicians and an inexpensive reference for the pharmacist.

L. F. Tice.



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